Is a Digital Photograph Worth a Thousand Words?

Crime Scene Photography and the Digital Transition

Submitted by

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Introduction

As a crime-fighting and crime-solving tool, few items wield the impact of an accurate photograph. As the old adage claims, "a picture is worth a thousand words." This is especially true in the law enforcement community. Crime scene photographs taken of wounds, blood spattered walls and ransacked homes forever preserve the violence, trauma and loss that victims of crime suffer. Crime scene photos document, in sometimes-graphic detail, the effects of crime as well as the actions of the victims and suspects as they were shortly after the incident. Although they are intended as an impartial record of reality, these photographs also have a tremendous affect on a jury as they can visually "pull" the viewer into the environment, the personalities and the actions of the involved parties.

Thirty-five millimeter (35mm) crime scene photographs have been almost universally accepted for decades as authentic depictions of the intended subject. These film based cameras were used by most every law enforcement agency in one form or another and the images were routinely admitted into criminal courtrooms as evidence with minimal, if any challenges. This unquestioned acceptance of photographic evidence however is changing due to the advancements of digital technology.

Digital photography has permeated the consumer market in an overwhelming fashion. The benefits of the digital camera are very appealing as the cameras are capable of capturing quality images, providing instant feedback to the photographer and are easily

shared with others via electronic mail. The professional photographer is also making the transition to digital photography as the camera and image quality is constantly improving and the costs are becoming more feasible. One of the last holdout markets that is making the transition to digital photography is law enforcement.

From Criminal to Crime Scene

Today's crime scene photographs serve many purposes. They can be utilized to "preserve" the scene of the crime, refresh the memories of victims, witnesses and law enforcement officers, provide insight into the mind of the perpetrator, reconstruct the crime scene and most importantly, to aid in the location, arrest and prosecution of the suspect. While these images are multifunctional for today's investigators, the original intent of the law enforcement photograph was quite different.

A popular investigative philosophy in the latter portion of the 19th century was that criminals possessed deviant physical traits subject to identification and classification. As a result, law enforcement photography was directed at capturing the criminal's physical characteristics. Early in the 20th century, French law enforcement officer Alphonse Bertillion pioneered an early version of crime scene photography, focusing on capturing the crime scene instead of the criminal. He was of the opinion that photographs should be taken of items of evidence before they were moved or collected so that the photos could be later used to reconstruct the crime scene. He used mats printed with metric frames mounted along the sides of photographs. This system was a primitive method of

photographic measurement which helped the investigator calculate a "floor plan" of the crime scene. Bertillion was also the first to photograph the front, top and side views of a person or object involved in a crime[1].

Crime scene photography became commonplace in the 1920's and 1930's as photographs depicting the violent actions and deaths of gangsters such as "Pretty Boy" Floyd, John Dillinger and "Machine Gun" Kelly frequently appeared in films and in the news. When J. Edgar Hoover became the director of the Federal Bureau of Investigation in 1924, he instituted his progressive views of the use of science as an impartial tool in crime documentation and analysis. One of the technologies implemented by Hoover was the use of means to exhaustively collect every piece of factual evidence linked to a particular person or crime. One of the primary technologies used to accomplish this task was the use of crime scene photography as an objective method of fact preservation[2].

As crime scene photographs shifted focus from solely that of the criminal to the documentation of the scene and the scientific methodology for solving crime, the images improved dramatically. Close up photographs of physical evidence such as; fibers, hair, bloodspatter, wounds, bite marks, tire tracks and fingerprints became common. These tools increasingly became of tremendous benefit to the law enforcement investigator. Throughout much the 20th century, however, the content of crime photographs changed very little. In the past decade, however, the technology has changed greatly. Moving away from the traditional film process, digital technology has emerged as the new "gold standard." Before discussing why it is so important for policing to transition to this photo

technology, however, we should first answer the question, "What is this digital stuff, why is it so much better, and why should I care?"

Digital Technology

Photography, much like all other areas of technology, is changing and progressing on a daily basis. The 35mm cameras seen as the standard for not only law enforcement, but in all types of photography for decades, are now giving way to digital technology. The ability to capture high quality images and view them instantly is tremendously appealing to today's photographers. Additionally, the cost savings of not purchasing film or paying for photo development are benefits to the transition to digital imaging.

In the past ten years, photographic technology has accelerated at a pace almost equivalent to progress seen in computer technology. Just as computers have dramatically increased speed, storage, graphics and software, so has the camera industry. In 1986, Kodak scientists invented the worlds first megapixel sensor capable of recording 1.4 million pixels that could produce a 5x7 inch digital quality print[3]. As more pixels equates to sharper images, the quest for more is driving the industry.

The Megapixel

In layman's terms, digital means that the photographic image is divided into tiny units of dots or squares known as pixels. Pixels are the programmable units of an image that can be processed by computers[4]. Megapixel capacity, the yardstick by which most

consumers and professionals judge their photographic equipment, has more than doubled in each of the past few years. The megapixel count during the 1990's was not refined or high enough to equal the standard 35mm image. These early digital "prototypes" of one to two million-pixel images did not provide the crisp detail required for enlarged images that are necessary for close examination of details or enlargements (beyond 8x10). For comparison, standard 200-speed film can produce the equivalent of an 18-megapixel image[5]. State-of-the-art camera equipment in 2000 had megapixel capacity of one to three megapixels. In 2003, the industry standard was in the five to six megapixel ranges; now equipment is in the 12 to 15-megapixel ranges. In March 2005, Kodak announced plans for 16, 18, and 22 megapixel professional grade cameras[6]. As megapixel clarity continues to increase, the need for its use in policing becomes more evident.

Law Enforcement and Digital Imaging

Digital photographic technology has been around for many years however the law enforcement community has for a variety of reasons, resisted or delayed the transition from 35mm to digital. The implementation costs, until recently, were prohibitive as the cost of the professional digital cameras reached upwards of $30,000 for a superior camera, and the Internet, the current vehicle to which images are shared, stored and viewed was not fast enough to handle the large file sizes that are common with photographs. Additionally, the early versions of the digital storage mediums were neither sophisticated enough nor large enough to handle large numbers of images.

The digital imaging environment also carries the perception that it is an easily enhanced and manipulated medium that is ripe for legal and technical challenge (Michael Crichton's novel "Rising Sun" for instance, focused, in part, on manipulated digital surveillance data as a means to conceal a homicide from the police). The relative ease to manipulate or enhance a digital image for unethical purposes has swayed or delayed some law enforcement agencies from making the transition from 35mm[7]. Although there is credence to this notion, the reality is that conventional photography is almost as easily manipulated in the darkroom or scanned into a computer, digitized, and then manipulated as digital photography. Altered 35mm images are especially common in the media, examples of which have been in the supermarket tabloids for decades.[8]

When law enforcement adopts new and changing technologies, challenges are always encountered. Digital photography is no exception. During the last twenty years, law enforcement transitioned to many new technologies such as computers, record management systems and semi-automatic handguns. As with any new change in operations or services, both organizational and legal challenges will have to be overcome. The transition to a digital imagining environment has tremendous promise as a crime solving/fighting tool, but it is also fraught with many potential problems that can severely limit this technology's effectiveness if not addressed at the onset of implementation.

The Digital Transition

While the digital transition to crime scene photography has yet to be completely integrated in the law enforcement community, other aspects of digital technology are rapidly gaining acceptance. Digital audio, for instance, is quickly gaining exposure and acceptance as well as digital video and digital in-car camera systems.[9] Early generation analog and VHS recording systems are also slowly phasing out and being replaced by digital systems. In 2000, the most recent year for which Bureau of Justice statistics are available, 47 percent of sheriff's offices and 29 percent of local police departments used digital imaging for mug shot photography. Twenty-nine percent of local police departments used digital imaging technology for suspect composites; 27 percent of sheriff's offices and 11 percent of local police departments used digital imaging technology for fingerprints[10].

To aid law enforcement agencies in their digital transition, the Scientific Working Group on Imaging Technologies (SWIGIT) was formed. SWIGIT is an organization made up of photographers, scientists, instructors, and managers from federal, state, local and international law enforcement agencies, as well as academic and research communities. SWIGIT provides definitions, standards, sample policies, and recommendations for the capture, storage, processing analysis, transmission and output of digital images for use in law enforcement[11]. While SWIGIT provides policy, workflow guidance and direction for an agency; the startup and maintenance costs will still be serious considerations to be addressed prior to implementation.

The Cost

Change does not come cheap. The transition to a digital imaging environment for crime scene photography will have some substantial upfront costs. These costs include new cameras, lenses, flashcards and associated equipment. Aside from these end user expenses, however, several other significant purchases need to be made in order to facilitate the successful transition.

The standard, low bid, local government issued computer will most likely be ill-equipped to handle the digital photograph file load. The computers used for both the photo input and photo viewing stations need to be powerful enough to store, send and receive large quantities of JPEG photograph files[12]. SWIGIT recommends a "Master copy" (which is the digital equivalent of an original film negative) of each photograph be maintained in the same manner that an agency would preserve a film negative[13]. This master copy should be maintained, depending on the volume of images, on either a DVD or on a computer network so as to preserve the integrity of the "original" image.

Printers will also need to be upgraded to a heavy duty, commercial photo-quality machine that is capable of delivering clear images in a reasonably rapid manner. Policies should be developed to provide guidance for the end user as to when it is appropriate to print the digital images. If investigators print every image they need to view, then the goal of efficiency and cost reduction is minimized as printer, ink and copy paper will be wasted. Crime scene images, should, for the most part, only be printed for use in court. A photo management software system will need to be purchased to efficiently manage the input, storage, viewing and authentication of crime scene images. This system could be located

in the Identification/CSI section, Records Section or Investigations as location would be dependent upon the number of users, input stations, printing locations etc. Additionally, a user friendly system that contains a search mechanism, image authentication element and record keeping function will be a tremendous labor saver and useful in the event the admissibility of the images are challenged in court.

The Benefits

The benefits for a large agency to transition from 35mm film photography to a digital imaging environment for crime scene photography are numerous. After the equipment, technology, training, and implementation costs are initially absorbed; the following benefits can be expected:

- Images will be improved, as the photographer will have instant feedback by looking at the camera's LCD screen to determine if the image taken was suitable, lighting was correct etc.
- Photo developing costs for materials and labor will be drastically reduced due to the images being saved to CD's or computer hard drives as opposed to the traditional chemical development and paper printing method.
- Photo media storage will be streamlined, as images will be stored on CD's and computer hard drives instead of storing environmentally sensitive photo negatives in file cabinets.

- Lastly, the ability to share the images electronically with fellow department employees, prosecutors, and defense attorneys will expedite the timeliness and flow of information.

Avoiding the Digital Dangers

Although the transition to digital crime scene photography can have tremendous benefits to the law enforcement investigator, without extensive research and analysis, it can bring tremendous grief to an organization. The poorly executed digital transition plan that results in lost, inadmissible or manipulated photographic evidence can be disastrous to an agency and the law enforcement community.

The following steps are recommended to prepare a law enforcement agency for the transition to digital crime scene photography:

- Secure agency head buy-in. Without buy-in and support from the executive manager and his or her staff, digital transition will be a difficult endeavor. Equipment and computer technology will need to be purchased, policies will need to be developed and training implemented in order for success to be realized. Again, if the chief executive does not subscribe to the need for digital transition, and direct the project manager to implement the new process, then the process will struggle.
- Extensive stakeholder analysis should include all within the agency who will use the digital equipment to take the crime scene photographs and view, use, print,

sell, store, and share the images. Consult these users on their needs and workflow suggestions. Without thorough stakeholder buy-in, the transition will be difficult.

- Obtain legal consultation from the local District Attorney's office. Even the photograph of the bad guy holding the smoking gun is of little use if it cannot be admitted into court. Determine what your prosecutor's office prefers in terms of image authentication, manipulation and enhancement policies and standards, as well as what is required for courtroom presentations. Again, admissibility of the crime scene image is the goal.

- Establish a Master file for each digital image. Although manipulation of digital images can be accomplished fairly easily, concealing the manipulation file when compared to the "Master" file is difficult. The Master image should be copied, but never altered or manipulated.

- Establish training and equipment standards to minimize problems with authenticity and admissibility. Do not permit the use of personal camera equipment including camera phones. This phenomenon is already extremely popular with the general public as millions of camera phones are in circulation and utilized to document everyday life as well as tragedy. In fact, many of the photographs used by media depicting the July 7, 2005 terrorist bombing in London were taken with camera phones used by subway commuters then emailed to news outlets[14]. The capture of quality crime scene photos cannot be completed with personal devices and it also cannot be done without the proper training. Additionally, the point-and-shoot style cameras that most people utilize as their personal photographic equipment are ill suited for detailed crime scene images.

Most personal, point and shoot style digital cameras default at a setting of 640 x 480 pixels per inch, far below the required minimum for analytical quality photographs[15].

- Capture digital images, do not delete them! The establishment of a policy that dictates saving all images that are captured reduces the chances of courtroom challenges later. There is no cost associated with taking more images to appropriately capture the intended subject. But, deleting a poor shot or the unnecessary image can raise the question of impropriety on behalf of the CSI.

Conclusion

The digital world is upon us and here to stay. Both video and audio has changed and consumer photography is also changing wholesale to digital technology. Moving to a digital platform is not longer "leading edge" behavior; it is merely keeping up with the state of the art in public and private applications. This technology has not only reached the equivalent of 35mm film in terms of quality, it is still growing and improving every day.

At first glance, the transition from the 35mm film camera to the digital camera seems like a rather inconsequential change. After all, isn't a camera a camera? No, its not. The transition to digital requires extensive preparation and analysis, beyond the purchase of new cameras, to effectively navigate the change. It requires new methodologies from the digital image capture in the field, to the media storage and the presentation of the images

in the courtroom. The transition requires new policy and training standards and strict adherence to those standards. Lastly, it requires an organizational commitment to change.

The typical law enforcement crime scene photo operation centers around the 35mm camera, bundles of film negatives kept in drawers and expensive developing/copying costs. The transition to a digital imaging environment for crime scene photography entails a much more streamlined workflow and reduced cost for labor, supplies, and duplication of the images. The digital camera will enable the officer or CSI technician to capture better photographs, with instant feedback in the field to determine if they appropriately captured the intended subject matter. Digital images would be stored on DVD's or computer network, saving time and money with a "just in time" printing of photos only when needed. It also eliminates the need to store negatives and make copies manually. Digital images can be shared (both inside and outside of an organization) electronically and viewed from a computer monitor. Finally, if copies of the original digital mage need to be enhanced for investigative purposes (zoom, lighting changes etc.) the copy can be adjusted with minimal effort. The agency that does not get on board soon with the digital transition will be sacrificing efficiency for the status quo.

When properly implemented, the transition to digital imaging for crime scene photography can expedite the flow of information, lower the operational costs of a crime scene investigations unit and generate higher quality images. But most importantly, the well implemented transition can ensure that a *digital photograph is worth a thousand words.*

End notes

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